Then

$$Q\,F(t) = B(t) \tag{16}$$

and

$$B(t - a) = B(t)\,f(a). \tag{17}$$

Furthermore

$$B(\overline{t - a_1} - a_2) = B(t - a_1)\,f(a_2) \tag{18}$$

that is

$$B(t - [a_1 + a_2]) = B(t)\,f(a_1)\,f(a_2) \tag{19}$$

$$= B(t)\,f(a_1 + a_2) \tag{20}$$

Hence

$$f(a_1 + a_2) = f(a_1)\,f(a_2), \tag{21}$$

and similarly

$$f(a + a + a + \cdots) = f(na) = [f(a)]^n \tag{22}$$

$$= [f(n)]^a \text{ by symmetry.} \tag{23}$$

Again,

$$f(1 \times a) = [f(1)]^a \tag{24}$$

But $f(1)$ is a constant. Let us put

$$f(1) = e^{-s} \tag{25}$$

where s is a constant still to be determined. Then, by (24)

$$f(a) = e^{-sa} \tag{26}$$

and by (17)

$$B(t - a) = B(t)\,e^{-sa} \tag{27}$$

that is, the births per unit of time increase in geometric progression at the rate s.

Furthermore, this is also the rate of natural increase per head of the population, for according to (5), (6) and (27) we have

$$\frac{B(t) - D(t)}{N(t)} = \frac{B(t) + B(t)\int_0^\infty e^{-sa}\,p'(a)\,da}{B(t)\int_0^\infty e^{-sa}\;p(a)\;da} \tag{28}$$

$$= \frac{1 - \{1 - s\int_0^\infty e^{-sa}\, p(a)\, da\}}{\int_0^\infty e^{-sa}\; p(a)\;\; da} \tag{29}$$

$$= s. \tag{30}$$

But by hypothesis this quotient is equal to the constant rate of increase r of the population. Hence

$$s = r. \tag{31}$$

Now, according to (4), (27) and (31)

$$B(t) = B(t) \int_0^\infty e^{-ra}\, p(a)\, m(a)\, da \tag{32}$$

$$1 = \int_0^\infty e^{-ra}\, p(a)\, m(a)\, da. \tag{33}$$

Therefore r is a root of (33). But r, the rate of natural increase, is constant by hypothesis. Therefore it must be a *real* root of (33), for complex roots would introduce oscillations. But (33) has only one real root, because $p(a)$, $m(a)$ is nowhere negative. If we denote this real root by ρ, we have therefore

$$r = \rho \tag{34}$$

and the coefficient of age distribution is given by

$$c(a) = \frac{B(t - a)}{N(t)}\, p(a) \tag{35}$$

$$= \frac{B(t)\; e^{-\rho a}}{N(t)}\, p(a) \tag{36}$$

$$= b\; e^{-\rho a}\; p(a). \tag{37}$$

But this is the stable age distribution. Thus, the conditions of the problem fully determine the age distribution (37) and none other is possible.

The theorem enunciated at the outset is therefore established.

BOTANY.—*New species of Costa Rican plants.*[1] C. V. MORTON, U. S. National Museum. (Communicated by WILLIAM R. MAXON.)

During the last two years the region about El General in the Province of San José, Costa Rica, has been intensively explored by Dr. Alexander F. Skutch. The flora has proved of great interest and the author plans to publish later a general discussion of its composition and relationships. The following new species represent only a portion of those thus far discovered by Dr. Skutch within this comparatively small area. It may be noted with pleasure that Professor Pax and Dr. K. Hoffmann have dedicated to him an interesting new genus of Euphorbiaceae.

Dioscorea borealis Morton, sp. nov.

Sect. *Centrostemon.* Herba dextrorsum volubilis; folia alterna longe petiolata, petiolo ca. 6 cm longo glabro sulcato; lamina foliorum late ovata, maxima 11.2 cm longa et 9.8 cm lata, apice acriter acuminata, basi leviter cordata, membranacea, utrinque concolor glabra integra, nervis primariis 9–11; inflorescentiae ♂ axillares, geminae vel ternae, usque ad 17 cm longae, non ramosae, rhachibus rectis subglabratis, floribus racemosis solitariis, numerosis, pedicellis 1–1.5 mm longis minute puberulis basi bracteatis, bracteis minutis subulatis puberulis; perianthii segmenta purpurea ovato-oblonga, 1.75 mm longa, patula, glabra; stamina 6, filamentis in tubum 1 mm longum connatis, antheris connatis sursum dehiscentibus; rudimentum stylinum nullum; flores ♀ ignoti.

Type in the U. S. National Herbarium, no. 1,638,052, collected in the vicinity of El General, Prov. San José, Costa Rica, altitude 880 meters, June, 1936, by Alexander F. Skutch (no. 2638).

The only previously known North American species of the section *Centrostemon*, *D. panamensis* Knuth, is quite different from the present, which doubtless finds its closest relationship with *D. larecajensis* Uline, of Bolivia, Peru, and Ecuador. Of this I have examined a specimen of the type collection (*Mandon* 1231) and find that the floral structure is essentially like that of *D. borealis*, but that the leaves are thicker, more prominently veined, and minutely puberulous on the nerves beneath. The leaves of *D. borealis* are perfectly glabrous.

Dioscorea remota Morton, sp. nov.

Sect. *Cryptantha.* Herba volubilis, caulibus dextrorsum scandentibus flavidis glabris striatis subangulatis; folia alterna longe petiolata, petiolo ca. 8.5 cm longo glabro paullo supra basin tumido; lamina foliorum late ovata, ca. 15 cm longa et 10.5 cm lata, integra, apice breviter (1.5 cm) acuminata, basi cordata, utrinque glabra, 7–9 nervia, nervis medianis areolam ovalem formantibus; inflorescentiae ♂ axillares, solitariae vel binae, perlongae, usque ad 90 cm longae, rhachi glabra non flexuosa,

[1] Published by permission of the Secretary of the Smithsonian Institution. Received March 1, 1937.

internodiis 1–6 cm distantibus, ramulis geminis simplicibus vel raro semel ramosis 4–11 cm longis, rhachibus interdum paullulum flexuosis basi bracteatis, bracteis lanceolatis ca. 5 mm longis; flores solitarii remoti sessiles bracteolati, bracteolis latis scariosis cucullatis concavis apiculatis glabris; perianthium purpureum glabrum, tubo cylindrico 2.75 mm longo, ca. 0.9 mm lato, lobis patulis ovatis 1.5 mm longis et 1 mm latis; stamina longe supra basin tubi perianthii inserta, filamentis alternatim inaequalibus, eis segmentis interioribus oppositis longioribus, ca. 1.2 mm longis, ceteris ca. 0.6 mm longis, antheris introrsis oblongis ca. 0.9 mm longis, ex fauce paullo exsertis; rudimentum stylinum nullum; flores ♀ ignoti.

Type in the U. S. National Herbarium, no. 1,642,272, collected in the vicinity of El General, Prov. San José, Costa Rica, altitude 975 meters, December, 1935, by Alexander F. Skutch (no. 2197).

This, the first North American species of the section *Cryptantha*, need not be compared minutely with any of its Brazilian relatives, for it is well distinguished from all by its exceedingly long and relatively sparsely branched inflorescences, remote flowers, broad scarious bracteoles, and large flowers with elongate perianth tube, and by its large, ovate, deeply cordate leaves.

Costus formosus Morton, sp. nov.

Subg. *Eucostus*. Herba erecta caulescens 3.5 m alta; folia alterna, vagina brevi 4–5 cm longa inflata striata ubique brevissime puberulenta, ligula brevi usque ad 5 mm longa biloba margine longe ciliata; lamina foliorum sessilia oblanceolata vel oblonga, usque ad 23 cm longa et 7 cm lata vel verisimiliter majora, apice breviter acuminata, basi lata obtusa, supra glabra costa excepta, subtus ubique puberula; spica terminalis erecta sessilis cylindrica 19 cm longa et 4 cm lata, bracteis late ovatis obtusis dense imbricatis rubris (siccitate castaneis apice rubescentibus), ca. 4.7 cm longis, glabrescentibus, margine scariosis pilosulis, lineam dorsalem callosam flavam gerentibus; calyx ruber campanulatus glaber perspicue striatus, tubo 5 mm longo, 6 mm lato, lobis deltoideis ca. 5 mm longis margine scariosis pilosis; corollae tubus cylindricus 2–2.5 cm longus, 2.5–3.5 mm latus, flavus, lobis rubris oblanceolatis, ca. 4.3 cm. longis, 10–12 mm latis, glabris acutis; labellum flavum ca. 5.5 cm longum quam corolla brevius, glabrum, apice trilobum, lobis lateralibus ca. 6 mm longis et 5 mm latis apice leviter bilobulatis margine integris, lobo medio anguste lineari ca. 7 mm longo et 0.7 mm lato integro obtuso; stamen longissimum (ca. 7 cm longum), labellum et corollae lobos evidenter superans, filamento rubro petaloideo glabro 3–5 mm lato apice rotundato antheras 5 mm superante; ovarium 6–7 mm longum glabrum album; stylus gracilis glaber; stigma ca. 3.5 mm latum.

Type in the U. S. National Herbarium, no. 1,638,056, collected near El General, Prov. San José, Costa Rica, altitude 850 meters, July, 1936, by Alexander F. Skutch (no. 2775).

The most nearly related species is undoubtedly *Costus sanguineus* Donn. Sm., which agrees in corolla color, shape of bracts, and trilobed labellum, but nevertheless differs in many important characters, as follows:

Exterior corolla segment longer and broader than the remaining two, sericeous-pilose on the margins, about equaling the labellum; ovary densely pilose; middle lobe of the labellum shorter than the two lat-

eral lobes; filament produced above the anthers in a triangular acutish apex, this often inrolled; corolla tube over 5 mm. side; calyx sparsely sericeous; leaves densely long-hirsute on both surfaces; sheath long, tightly appressed, long-hirsute..... *C. sanguineus*

Exterior corolla segment equal to the others, glabrous, much exceeding the labellum; ovary glabrous; middle lobe of the labellum linear, exceeding the lateral lobes; filament produced above the anthers in a semi-orbicular plane apex; corolla tube slender, not over 3.5 mm. wide; calyx glabrous, except on the margins; leaves glabrous above, minutely puberulous beneath; sheath short, inflated, puberulous..... *C. formosus*

For definite determinations in *Costus* it is usually necessary to have flowers. Several non-flowering specimens from Costa Rica and Panama that have been identified as *C. sanguineus* are certainly not that species, and may belong to *C. formosus*, but I do not cite them because the leaf and sheath characters listed above may not hold when further collections are available.

Costus Skutchii Morton, sp. nov.

Subg. *Eucostus*. Herba caulescens; folia distincte sed breviter petiolata, petiolo glabro ca. 15 mm longo, vagina glabra longissima striata, ligula ca. 7 mm longa, aequaliter biloba haud truncata vel fissa, infra petiolum puberula, marginem versus pilosa; lamina foliorum oblongo-oblanceolata 25 cm longa et 7.2 cm lata (inferiores verisimiliter longiores), apice acriter acuminata, basi obtusa, supra glabra (nervo mediano excepto), subtus glabra; spica erecta ellipsoidea obtusa terminalis, 9 cm longa et 3.5 cm lata, bracteis rubris, siccitate nigrescentibus, dense imbricatis coriaceis, ca. 3.5 cm longis, apice rotundatis scariosis ciliatis non appendiculatis, linea callosa non perspicua, externe apicem versus glabratis inferne sericeopilosis, intus glabris; calyx tubulosus 7 mm longus, coriaceus sericeus, leviter trilobatus; corollae tubus flavus ca. 2 cm longus, anguste cylindricus, lobis anguste obovatis coccineis, ca. 3 cm longis et 1.2 cm latis, integris glabris, apice rotundatis; labellum corolla longius, ca. 7 cm longum, cucullatum, rubro-purpureum, venis pallidis, non lobatum, apice ca. 4.5 cm latum subtruncatum perspicue lacerato-dentatum, basin versus squamiferum; ovarium cylindricum ca. 4.5 mm longum, glabrum.

Type in the U. S. National Herbarium, no. 1,638,054, collected near El General, Prov. San José, Costa Rica, altitude 850 meters, July, 1936, by Alexander F. Skutch (no. 2690).

The most nearly related species is probably *Costus cylindricus* Jacq., which has yellow corollas, with the tube only 1 cm long, and a smaller, yellow, entire labellum. *Costus spicatus* L. differs in its smaller, yellow, differently formed flowers, as well as in other characters. The corolla lobes of *C. sanguineus* Donn. Sm. are similar in color to those of the present species, but the labellum is entirely different in color, size, and shape. *Costus splendens* Donn. Sm. differs widely in the shape of the labellum, as well as in other characters.

Skutchia Pax & K. Hoffm., gen. nov.

Flores dioici, ♂ apetali, ♀ nudi. Sepala ♂4, ad medium fere connata, imbricata. Stamina 4, episepala; filamenta libera, sepalis longiore, in ala-

bastro incurva; antherae biloculares, introrsae. Discus O. Ovarii rudimentum columnare. Ovarium biloculare, loculo uno abortivo; styli 2, fere liberi, papillosi; ovulum solitarium, pendulum.—Arbor, partibus juvenilibus et inflorescentiis exceptis, glabra. Folia alterna, petiolata, penninervia; stipulae deciduae. Inflorescentiae axillares, satis longae, ♂ amentiformes, squamis parvis, triangularibus, juxta vel interflores sitis onustae. Flores ♂ sessiles, ♀ pedicellati. Fructus ignotus.

Skutchia caudata Pax & K. Hoffm., sp. nov.

Arbor, ca. 18 m alta. Ramuli graciles, juveniles compressi breviter puberuli; rami teretes, glabri, striati, cortice rubro-brunneo tecti. Petiolus ca. 1 cm longus; limbus 10–12 cm longus, 3–3.8 cm latus, lanceolatus, leviter falcatus, caudato-acuminatus, basi acutus, integer, chartaceus, eglandulosus, reticulato-venosus; costae secundariae ca. 8, arcuato-adscendentes, prope marginem anastomosantes; stipulae ca. 1 mm longae, triangulares, breviter acuminatae. Inflorescentiae ♂ ca. 8 cm longae, satis densiflorae, ♀ ca. 10 cm longae, pendulae, utriusque sexus breviter puberulae et glandulis parvis adspersae. Flores ♂ ca. 2 mm lati. Calycis ♂ lobi ovati, acuti, basi subsaccati, extus parce pilosi, apice fimbriati. Filamenta ca. 3 mm longa, calyce duplo longiora. Ovarii rudimentum calyce brevius, pilosum. Pedicelli ♀ 1–3 mm longi. Ovarium verrucosum; styli ad 3 mm longi.

Type in the U. S. National Herbarium, no. 1,641,605, a pistillate plant collected near El General, Prov. San José, Costa Rica, altitude 950 meters, January, 1936, by Alexander F. Skutch (no. 2383). The staminate specimen collected at the same time and place is no. 2386.

"Mr. C. V. Morton, who is working on the Skutch collection, has already recognized that these specimens represent a new genus, which he believes related to *Tetrorchidium*. *Skutchia* belongs, to be sure, to the Gelonieae, but is nevertheless tolerably isolated in the group and is not more nearly related to *Tetrorchidium* than to other genera of this tribe. It is distinguished from all other Gelonieae by the naked pistillate flowers and by the ovary being one-celled through abortion of the second cell. Furthermore the inflexed stamens are remarkable."

Heliocarpus excelsior Morton, sp. nov.

Arbor altissima, 36 m alta, ramuli teretes stellato-puberulenti lenticellis conspicuis praediti; folia alterna stipulata (stipulis deciduis), petiolata, petiolo tereti usque ad 12 cm longo stellato-puberulento; lamina foliorum usque ad 19 cm longa et 18 cm lata, apicem versus sinuato-triloba lobo terminali et lobis lateralibus acuminatis, basi leviter cordata, appendiculata, appendiculis ca. 4, glanduliferis, membranacea serrulata utrinque concolor minute stellato-puberulenta, nervis 7 primariis digitatis; inflorescentia magna terminalis, 15 cm alta et 23 cm lata, rhachibus stellato puberulentis, pedicellis gracilibus usque ad 8 mm longis; alabastra obovata ca. 4.5 mm longa; sepala oblonga 6 mm longa, ca. 1.6 mm lata, acuta exappendiculata externe puberulenta; petala sepalis breviora spathulata ca. 4 mm longa glabra plerumque leviter crispa; stamina 16–19; stylus 2 mm longus, breviter bifidus, ovario longior; capsula cum radiis 6–8 mm lata, stipitata (5 mm), corpore capsulae anguste elliptico, 4 mm longo, 1.6 mm lato, dense piloso, radiis ca. 4 mm longis, longe pilosis.

Type in the U. S. National Herbarium, no. 1,642,302, a fruiting specimen

collected in the vicinity of El General, Prov. San José, Costa Rica, altitude 1100 meters, December, 1935, by Alexander F. Skutch (no. 2250). The flowers are described from *Skutch* 2266, collected near the same locality at an altitude of 825 meters.

The only related species are *Heliocarpus appendiculatus* Turcz. and *H. chontalensis* Sprague, both of which may be at once distinguished by their conspicuously discolorous leaves with a conspicuous, dense, whitish or yellowish tomentum beneath. The leaves of *H. excelsior* are concolorous and the hairs are minute, sparse, and scarcely visible except under a lens. The leaves of *H. excelsior* differ in shape also, being almost square in outline, with cordate base, trilobate apex, and lightly serrulate margins; on the contrary those of *H. appendiculatus* and *H. chontalensis* are ovate, usually unlobed and in *H. appendiculatus* coarsely serrate. Other differences are also apparent, such as the narrower capsule body, the fewer stamens, and the differently shaped leaf appendages. *Heliocarpus excelsior* is the largest known tree of the genus.

Begonia lignescens Morton, sp. nov.

Sect. *Ruizopavonia?* Caules elongati scandentes lignosi glabri, nodis incrassatis radicantes; folia alterna stipulata, stipulis caducis, cicatricibus perspicuis, petiolata, petiolo brevi ca. 3 mm longo fuscescente glabro; lamina foliorum anguste oblonga, 7–9 cm longa et 2–2.6 cm lata, obliqua, apice breviter acuminata, basi cuneata obliqua, membranacea apicem versus paullo denticulata utrinque glabra non squamosa, pennivenia, venis primariis 4–5-jugis subtus fuscescentibus; inflorescentiae monoicae terminales usque ad 16 cm longae et 20 cm latae, pedunculatae (pedunculo 3.5–4 cm longo), cymosae, multoties dichotomae, rhachibus glabris leviter angulatis, bracteis caducis longe lanceolatis acutis glabris; sepala floris ♂ duo alba lancolata, 15 mm longa et 5 mm lata, acuta glabra; petala 2 minuta ca. 2.5 mm longa; stamina numerosa, filamentis liberis quam antheris multo brevioribus; sepala floris ♀ alba duo elongato-lanceolata, fere 2 cm longa et 5 mm lata, glabra acuta; petala nulla; ovarium glabrum triloculatum trialatum, ala una (immatura) 1 cm longa cultriformi, alis ceteris reductis minimis, placentis bilamellatis ubique ovuliferis; styli tres basi connati sursum abrupte expansi bifidi, ramis spiraliter contortis ubique papillosis.

Type in the U. S. National Herbarium, no. 1,638,058–9, collected in the vicinity of El General, Prov. San José, Costa Rica, altitude 1160 meters, August, 1936, by Alexander F. Skutch (no. 2853).

Although similar in leaves and habit to *Begonia estrellensis* C. DC., the large acute narrowly lanceolate sepals of *B. lignescens* are distinctive and like no other species of the genus that I know. The sepals of *B. estrellensis* are small, rounded, and orbicular. These two species seem to be most naturally placed in the section *Ruizopavonia*, as characterized by Irmscher, from which they differ, however, in having male flowers with petals.

Cavendishia Skutchii A. C. Smith, sp. nov.

Frutex epiphyticus; ramulis subteretibus glabris rugosis; petiolis glabris rugosis 5–10 mm longis; laminis tenuiter coriaceis, in sicco metallico-sub-

caeruleis, oblongis, 10–15 cm longis, 3.5–5 cm latis, basi subcordatis vel subtruncatis, apice obtusis vel breviter et obtuse acuminatis, margine leviter incrassatis, supra glabris nitidis, subtus parce brunneo-pilosis vel punctatis, 5-pli-nerviis, nervis prope basin orientibus, supra impressis (vel inferioribus elevatis), subtus prominentibus, venulis utrinque prominulis; inflorescentiis axillaribus aliquot ad apices ramulorum, racemosis, 15–20-floris, subglabris, basi bracteis deciduis instructis; rhachide 5–7 cm longa; floribus in axillis bractearum alternarum solitariis, bracteis membranaceis integris oblongis vel late ovatis, 18–23 mm longis, 12–15 mm latis; pedicellis subteretibus 6–12 mm longis, basi et apice incrassatis, prope basin bibracteolatis, bracteolis membranaceis oblongis, 3–4 mm longis, margine sparse fimbriatis; calyce coriaceo, 4–5 mm longo et diametro, limbo suberecto tubum subaequante, lobis 5 deltoideis 1–1.5 mm longis acutis, margine breviter glanduloso-fimbriatis; corolla membranacea vel tenuiter carnosa, cylindrica, basi et apice alba, medio rosea, maturitate 13–15 mm longa, 3–4 mm diametro, apice contracta, lobis 5 parvis subacutis; staminibus subaequalibus, filamentis ligulatis tenuiter carnosis, superne intus breviter pilosis, alternatim 2 mm et 5 mm longis, connectivis nigrescentibus carnosis, antheris membranaceis flavis, alternatim 12 mm et 10 mm longis, tubulis amplis quam loculis 3-plo longioribus, per rimas elongatas dehiscentibus; stylo corollam subaequante, stigmate capitato.

Type in the U. S. National Herbarium, no. 1,642,549, collected in forest in the vicinity of El General, Province of San José, Costa Rica, at 1100 meters altitude, in August, 1936, by A. F. Skutch (no. 2802).

The closest ally of the new species appears to be *C. crassifolia* (Benth.) Hemsl., of southern Mexico and Guatemala. The present species differs from that by its slightly larger and metallic-colored leaves, which are usually subcordate rather than cuneate at base. In floral characters the two species are very similar; *C. Skutchii* has larger bractlets of the pedicels and has the calyx glabrous rather than brown-pilose distally.

Ardisia Skutchii Morton, sp. nov.

Subg. *Graphardisia*. Frutex 7.5 m altus; ramuli subteretes ca. 3.5 mm diam. glabri leviter striati; folia alterna estipulata, subsessilia, lamina oblanceolata usque ad 26 cm longa et 7 cm lata, apice acuminata, basi longe attenuata, papyracea integra utrinque pallidi concolori glabra eglanduliferi, venis primariis ca. 12-jugis arcuatis; inflorescentia alba terminalis ca. 10 cm longa et 12 cm lata, brevissime pedunculata bracteis magnis obovatis ca. 25 mm longis suffulta, rhachibus plus minus flexuosis robustis glabris eglanduliferis, inflorescentiis ultimis corymbosis paucifloris bracteis oblongis vel obovatis magnis suffultis, pedicellis 12–15 mm longis gracilibus glabris apice incrassatis; sepala alba imbricata late ovata, ca. 5.5 mm longa et 4 mm lata, rotundata glabra punctis lineatis satis paucis perspicuis picta; corolla alba roseo-tincta, ca. 15 mm lata, rotata, tubo ca. 2 mm longo, lobis late ovatis ca. 7 mm longis, 5 mm latis, obtusis glabris punctis dissite pictis; filamenta ca. 2 mm longa, crassa eglandulifera, basin versus latioribus et in tubum brevem connata; antherae lanceolatae 3 mm longae, non exsertae, poris apicalibus dehiscentes; ovarium glabrum conicum; stylus gracilis 4.5 mm longus glaber.

Type in the U. S. National Herbarium, no. 1,638,053, collected in the vicinity of El General, Prov. San José, Costa Rica, altitude 1070 meters, June, 1936, by Alexander F. Skutch (no. 2660).

The only related species is *Ardisia opegrapha* Oerst., which differs as follows:

Sepals oblong, 6 mm long, 2–3 mm wide; filaments and filament tube glanduliferous ..... *A. opegrapha*

Sepals broadly ovate, 5.5 mm long, 4 mm wide; filaments and filament tube eglanduliferous ..... *A. Skutchii*

Other differences also exist. The leaves of *A. opegrapha* are obviously petiolate, but those of *A. Skutchii* are almost sessile. The entire inflorescence of *A. opegrapha* is said by Mez to be deep rose and is so figured by Hooker (Bot. Mag. *pl. 6357*); that of *A. Skutchii* is, according to the collector, entirely white except for a faint pink tinge on the corolla.

Leiphamos lutea Morton, sp. nov.

Herba parasitica alba vel flavescens; caules 10–20 cm alti, ca. 1 mm lati, glabri teretes uniflori, bracteis 7–16-jugis lanceolatis ca. 6.5 mm longis, interdum apice unidenticulatis, basi fere ad medium connatis; pedunculus subnullus, vix 2 mm longus; calycis tubus ebracteatus 5 mm longus corollae arcte appressus, lobis 5 lanceolatis 2.75 mm longis, 1 mm basi latis, integris, acutis; corolla hypocrateriformis, tubo flavo 3.2–3.6 cm longo, basi et apice inflato, medio cylindrico, ca. 2 mm lato, glabro, fauce intus papilloso, lobis luteis late ovatis 6–9 mm longis, obliquis glabris cuspidatis patentibus; antherae sessiles exappendiculatae liberae faucem versus insertae; ovarium substipitatum ca. 13 mm longum glabrum eglanduliferum; stylus inclusus glaber ca. 15 mm longus; stigma compressum.

Type in the U. S. National Herbarium, no. 1,638,055, collected near El General, Prov. San José, Costa Rica, altitude 1130 meters, July, 1936, by Alexander F. Skutch (no. 2767).

Leiphamos aphylla (Jacq.) Gilg of the West Indies and South America is closely related but may be distinguished by its narrower, obtuse or merely acute corolla lobes; those of the present species are abruptly cuspidate-acuminate. *Leiphamos costaricensis* Standl. differs in its corolla lobes, as well as in its stamens. Another recent segregate from *L. aphylla* is *L. eximia* Sandw. of British Guiana, which also differs from *L. lutea* in its anthers and corolla lobes.

Columnea florida Morton, sp. nov.

Subg. *Collandra*. Frutex epiphyticus; caules crassi ca. 1 cm diam., pallidi vel rubescentes purpureo-maculati perspicue sulcati, hornotini hirsuti, pilis flaccidis multiseptatis, annotini glabrescentes; folia opposita valde inaequalia, majora breviter petiolata, petiolo 1 cm longo crasso densissime hirsuto; lamina foliorum majorum oblanceolata, maxima 35.5 cm longa et 10.5 cm lata, siccitate chartacea vel subcoriacea, apice breviter et acriter acuminata (ca. 2 cm), basi obtusa obliqua, margine integra, supra glabra vel basin versus pilis perpaucis instructa, apicem versus maculas 2 rubras gerens, subtus pallidior, apicem versus perspicue rubro-maculata, ubique appresso-pilosa, costa basi hirsuta, venis primariis ca. 12-jugis arcuatis; lamina foliorum minorum subsessilia anguste elliptica, ca. 3 cm longa, longe acuminata, supra glabra, subtus dense pilosa, venis paucis obscuris; flores axillares, in ramulis annotinis defoliatis et in hornotinis fasciculati, pauci vel